

In re Patent Application of
BAHLENBERG ET AL.
Serial No. 09/529,429
Filed: OCTOBER 30, 2000

In the Claims:

This listing of claims replaces all prior versions
and listing of claims in the application.

Claims 1-26 (cancelled).

27. (new) A telecommunications system comprising:
a central station;
subscriber lines of different lengths, the
subscriber lines being grouped into longer and shorter lines,
shorter lines are defined as lines having a length less than
X, and longer lines are defined as lines having a length equal
to or greater than X, where X is a system parameter determined
for a given telecommunications system; and

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a plurality of data modems connected to the central
station by the subscriber lines of different lengths with
duplex data being transmitted between the central station and
at least one data modem using very high rate digital
subscriber line (VDSL);

frequency divided duplex (FDD) is used at lower
frequencies for transmissions over the longer lines and
orthogonal frequency divided duplex (OFDD) is used at higher
frequencies for transmissions over the shorter lines.

28. (new) A telecommunications system as claimed in
Claim 27 wherein an extra cyclic prefix is used for OFDD
transmissions over shorter lines, and frequencies above an FDD
band are not used for longer lines.

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29. (new) A telecommunications system as claimed in
Claim 28 wherein the cyclic prefix is dimensioned for a
shorter line.

30. (new) A telecommunications system as claimed in
Claim 29 wherein the cyclic prefix is dimensioned for a line
of length X.

31. (new) A telecommunications system as claimed in
Claim 28 further comprising optical network units (ONUs) and
network terminations (NTs), each comprising at least one
transmitter, and being connected to the subscriber lines;
time-synchronization being performed between all transmitters
in ONUs and NTs in the system.

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32. (new) A telecommunications system as claimed in
Claim 28 wherein timing advance is calculated for each
subscriber line based upon the subscriber line length.

33. (new) A telecommunications system as claimed in
Claim 27 wherein different sub-carriers are used in up-stream
and down-stream transmission directions.

34. (new) A telecommunications system as claimed in
Claim 27 wherein a power boost is applied to FDD band
transmission.

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35. (new) A telecommunications system as claimed in
Claim 27 wherein both asymmetric digital subscriber line
(ADSL) and VDSL are used.

36. (new) A telecommunications system as claimed in
Claim 35 wherein both ADSL and VDSL are used on a single
subscriber line.

37. (new) A telecommunications system as claimed in
Claim 35 wherein the frequency band used for FDD is the same
as that used for ADSL in both up-stream and down-stream
transmission directions.

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38. (new) A telecommunications system as claimed in
Claim 35 wherein FDD band frequencies are power boosted to the
same power level as used for ADSL.

39. (new) A telecommunications system comprising:
a central station;
subscriber lines of different lengths, the
subscriber lines being grouped into longer and shorter lines,
shorter lines being defined as lines having a length less than
 X , and longer lines being defined as lines having a length
equal to or greater than X , where X is a system parameter; and
a plurality of data modems connected to the central
station by the subscriber lines of different lengths with
duplex data being transmitted between the central station and
at least one data modem using digital subscriber line (DSL);

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a first duplex format is used at lower frequencies for transmissions over the longer lines, and a second duplex format, different than the first duplex format, is used at higher frequencies for transmissions over the shorter lines.

40. (new) A telecommunications system as claimed in Claim 39 wherein an extra cyclic prefix is used for second duplex format transmissions over shorter lines, and frequencies above a first duplex format band are not used for longer lines.

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41. (new) A telecommunications system as claimed in Claim 40 wherein the extra cyclic prefix is dimensioned for a shorter line.

42. (new) A telecommunications system as claimed in Claim 40 wherein the extra cyclic prefix is dimensioned for a line of length X.

43. (new) A method of transmitting duplex data between a central station and at least one of a plurality of data modems using VDSL in a telecommunications system having the plurality of data modems connected to the central station by subscriber lines of differing lengths, the method comprising:

grouping the subscriber lines being into longer and shorter lines, shorter lines being defined as lines having a length less than X, and longer lines being defined as lines

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having a length equal to or greater than X, where X is a system parameter; and

using frequency divided duplex (FDD) for transmission at lower frequencies over the longer lines and orthogonal frequency divided duplex (OFDD) for transmission at higher frequencies over the shorter lines.

44. (new) A method as claimed in Claim 43 further comprising using an extra cyclic prefix for OFDD transmissions over shorter lines, and not using frequencies above an FDD band for transmission over longer lines.

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45. (new) A method as claimed in Claim 44 further comprising dimensioning the extra cyclic prefix for a shorter line.

46. (new) A method as claimed in Claim 44 further comprising dimensioning the extra cyclic prefix for a line of length X.

47. (new) A method as claimed in Claim 43 wherein the telecommunications system includes optical network units (ONUs) and network terminations (NTs), each comprising at least one transmitter, and being connected to the subscriber lines; and further comprising performing time-synchronization between all transmitters in ONUs and NTs in the system.

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48. (new) A method as claimed in Claim 43 further comprising calculating timing advance for each subscriber line based upon the subscriber line length.

49. (new) A method as claimed in Claim 43 further comprising using different sub-carriers in up-stream and down-stream transmission directions.

50. (new) A method as claimed in Claim 43 further comprising power boosting FDD band transmissions.

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51. (new) A method as claimed in Claim 43 wherein both asymmetric digital subscriber line (ADSL) and VDSL are used.

52. (new) A method as claimed in Claim 51 wherein both ADSL and VDSL are used on the same subscriber line.

53. (new) A method as claimed in Claim 51 further comprising using the same frequency band for FDD as used for ADSL in both up-stream and down-stream transmission directions.

54. (new) A method as claimed in Claim 51 further comprising power boosting the FDD band frequencies to a same power level as that used for ADSL.